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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/476,684	12/30/1999	GOPAL AVINASH	GEMS:0074-15	8155

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EXAMINER

DASTOURI, MEHRDAD

ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 06/18/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/476,684	AVINASH, GOPAL
	Examiner Mehrdad Dastouri	Art Unit 2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) Responsive to communication(s) filed on \_\_\_\_.  
 2a) This action is FINAL.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) Claim(s) 1-39 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_ is/are allowed.  
 6) Claim(s) 1-39 is/are rejected.  
 7) Claim(s) \_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 30 December 1999 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 11) The proposed drawing correction filed on \_\_\_\_ is: a) approved b) disapproved by the Examiner.  
 If approved, corrected drawings are required in reply to this Office action.  
 12) The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
 \* See the attached detailed Office action for a list of the certified copies not received.  
 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
 a) The translation of the foreign language provisional application has been received.  
 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.

4) Interview Summary (PTO-413) Paper No(s). \_\_\_\_.  
 5) Notice of Informal Patent Application (PTO-152)  
 6) Other: \_\_\_\_.

**DETAILED ACTION**

***Double Patenting***

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1-39 are rejected under the judicially created doctrine of double patenting over Claims 1-24 of U. S. Patent No. 6,208,763, and Claims 1-28 of U.S. Patent 6,173,083, since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows:

Method and system for enhancing a discrete pixel image, comprising smoothing image data representative of pixels of a reconstructed image, identifying structural features from the smoothed image data, orientation smoothing the structural features, homogenization smoothing non-structural regions, orientation sharpening the structural and blending the image data into data processed in accordance with the foregoing steps

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, 4-8, 22-24, 26-29, 30-33 and 35-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (U.S. 5,602,934) in view of Polzin et al (U.S. 6,166,545).

Regarding Claim 1, Li et al disclose a method for enhancing a discrete pixel image, the method comprising the steps of:

(a) smoothing image data representative of pixels of a reconstructed image (Figures 1 and 2; Equations 1-12; Column 5, Lines 64-67, Column 5, Lines 1-47; Column 7, Lines 4-13);

(b) identifying structural features from the smoothed image data (Figures 1 and 2; Column 7, Lines 4-67, Column 8, Lines 1-57);

(c) orientation smoothing the structural features (Figures 1 and 2; Column 5, Lines 64-67, Column 5, Lines 1-47);

(d) homogenization smoothing non-structural regions (Figures 1 and 2; Column 6, Lines 12-47; Column 7, Lines 4-67, Column 8, Lines 1-57);

(e) orientation sharpening the structural features (Figure 4; Equations 13-21; Column 10, Lines 2-67, Column 11, Lines 1-50);

(f) blending the image data into data processed in accordance with the foregoing steps (Figure 5, Steps 510, 516 and 518; Figure 6; Column 11, Lines 66-67; Column 12, Lines 1-10).

Li et al do not explicitly disclose blending texture from the image data into the processed data.

Blending texture from the image data into the processed data is well known as taught by Polzin et al based on homodyne detection in MRI (Teachings of IEEE Paper ISBN: 0278-0062 dated June 1991.

Polzin et al disclose MRI reconstruction using partial echo and partial NEX data acquisition by blending texture from the image data into the processed data of the image (Column 1, Lines 48-67, Column 2, Lines 1-35).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Li et al invention according to the teachings of Polzin et al to blend texture from the image data into the data processed in accordance with the steps (a) through (e) because it will enhance MRI images and will reconstruct the image by including missing image information.

Regarding Claim 2, Li et al further disclose the method of Claim 1, wherein the structural features are determined based upon a scaled threshold value (Column 13, Lines 9-40; Column 15, Lines 34-40).

Regarding Claim 4, Li et al further disclose the method of Claim 1, wherein in step (b) the structural features include pixels having values below a first threshold value but above a second, lower threshold value, and positioned adjacent to a structural pixel (Column 15, Lines 34-40).

Regarding Claim 5, Li et al further disclose the method of Claim 1, wherein step (c) includes dominant orientation smoothing pixels based upon a dominant orientation and an orientation orthogonal to the dominant orientation (Figures 2 and 3; Column 6, Lines 12-47).

Regarding Claim 6, Li et al further disclose the method of Claim 5, wherein dominant orientation smoothing is performed based upon a predetermined relationship between a characteristic of each structural pixel in the dominant orientation and in the orthogonal orientation (Figures 2 and 3; Column 6, Lines 12-47).

Regarding Claim 7, Li et al further disclose the method of Claim 6, wherein the characteristic is a number of counts of orientations within a neighborhood of each structural pixel (Column 7, Lines 4-36).

Regarding Claim 8, Li et al further disclose the method of Claim 1, wherein step (e) is performed only for structural pixels having a value above a desired lower limit value (Column 14, Lines 10-43).

With regards to Claims 22 and 23, arguments analogous to those presented for Claims 1 and 5 are applicable to Claims 22 and 23.

With regards to Claim 24, arguments analogous to those presented for Claim 2 are applicable to Claim 24.

With regards to Claim 26, arguments analogous to those presented for Claim 4 are applicable to Claim 26.

With regards to Claim 27, arguments analogous to those presented for Claim 6 are applicable to Claim 27.

With regards to Claim 28, arguments analogous to those presented for Claim 7 are applicable to Claim 28.

Regarding Claim 29, Li et al further disclose the method of Claim 1, wherein step (d) is performed only for structural pixels having a value above a desired lower limit value (Column 13, Lines 33-54).

With regards to Claims 30-32, arguments analogous to those presented for Claim 1 are applicable to Claims 30-32. Li et al further disclose the image acquisition system includes a magnetic resonance scanner (Figure 1; Column 5, Lines 10-47).

With regards to Claim 33, arguments analogous to those presented for Claim 2 are applicable to Claim 33.

With regards to Claim 35, arguments analogous to those presented for Claim 4 are applicable to Claim 35.

With regards to Claim 36, arguments analogous to those presented for Claim 5 are applicable to Claim 36.

With regards to Claim 37, arguments analogous to those presented for Claim 6 are applicable to Claim 37.

With regards to Claim 38, arguments analogous to those presented for Claim 7 are applicable to Claim 38.

With regards to Claim 39, arguments analogous to those presented for Claim 8 are applicable to Claim 39.

5. Claims 3, 9-21, 25 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (U.S. 5,602,934) further in view of Polzin et al (U.S. 6,166,545) and Dumoulin et al (U.S. 6,571,020).

Regarding Claim 3, Li et al disclose the method of Claim 2, wherein the scaled threshold value is computed based upon an initial threshold value (Column 13, Lines 9-40; Column 14, Lines 10-43; Column 15, Lines 34-40. Threshold function with lower cut off side value 0.9r and higher cut off value 1r.).

Li et al do not explicitly disclose the scaling factor is input by a user.

Dumoulin et al disclose a method for storing additional information in primary data sets for enhancing regions of MRI images by applying a user-adjustable intensity threshold (Abstract, Lines 13-18).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Li et al and Polzin et al combination according to the teachings of Dumoulin et al to apply a scaled threshold value input by a user because it will result in enhancing extraction of the structural features.

With regards to Claims 9 and 10, arguments analogous to those presented for Claims 1-3 are applicable to Claims 9 and 10.

With regards to Claim 11, arguments analogous to those presented for Claim 4 are applicable to Claim 11.

With regards to Claim 12, arguments analogous to those presented for Claim 5 are applicable to Claim 12.

With regards to Claim 13, arguments analogous to those presented for Claim 6 are applicable to Claim 13.

With regards to Claim 14, arguments analogous to those presented for Claim 7 are applicable to Claim 14.

With regards to Claim 15, arguments analogous to those presented for Claim 8 are applicable to Claim 15.

With regards to Claims 16 and 17, arguments analogous to those presented for Claims 1-4 are applicable to Claims 16 and 17.

With regards to Claim 18, arguments analogous to those presented for Claim 5 are applicable to Claim 18.

With regards to Claim 19, arguments analogous to those presented for Claim 6 are applicable to Claim 19.

With regards to Claim 20, arguments analogous to those presented for Claim 7 are applicable to Claim 20.

With regards to Claim 21, arguments analogous to those presented for Claim 8 are applicable to Claim 21.

With regards to Claims 25 and 34, arguments analogous to those presented for Claim 3 are applicable to Claim 25 and 34.

***Other prior art cited***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent 6,208,763 to Avanish is cited for a method and apparatus for enhancing discrete pixel images.

U.S. Patent 6,173,083 to Avanish is cited for a method and apparatus for analyzing image structures.

IEEE Transaction on Medical Imaging, ISBN: 0278-0062 to Noll et al is cited for homodyne detection in magnetic resonance imaging.

***Contact Information***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mehrdad Dastouri whose telephone number is (703)

305-2438. The examiner can normally be reached on Monday to Friday from 8:00 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9143 for regular communications and (703) 872-9143 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the technology Center Customer Service Office whose telephone number is (703) 306-0377.



Mehrdad Dastouri  
Primary Examiner  
Group Art Unit 2623  
June 13, 2003